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Millwork Cost Information Bureau

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Millwork Cost Information Bureau, "Are you applying burden properly?" (1920). *Individual and Corporate Publications*. 142.
https://egrove.olemiss.edu/acct_corp/142

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Are You Applying Burden Properly?

**A Review of Burden Applications
Prepared by
Millwork Cost Information Bureau,
Chicago, Illinois.**

**Reprint from
SASH-DOOR-FINISH, September, 1920,
309 Montgomery Building,
Milwaukee, Wis.**

Although a period of six years has elapsed since the Mill-work Cost Information Bureau introduced uniform cost accounting to the industry, nevertheless, cost accounting, among the trade generally, is still somewhat of a dark science. Usually when concerns not associated with this Bureau, are approached on the subject of costs, they profess to operate excellent cost finding systems—it is only in rare instances that a millman will admit that his cost-procedure is faulty, and most emphatically, not hazardous—still in the majority of cases, an examination of their methods reveals the fact that these same systems are in direct violation of the fundamental principles on which equitable cost results depend.

Every authority on costs will agree that burden is the most elusive factor of cost, not only as concerns its derivation but its application as well; and the final costs of a cost system that is most scientifically devised in all other respects, will be found sadly wanting if burden is applied incorrectly, i. e., if the “unit of measure” for burden is basically wrong.

What follows herein will, therefore, be directed toward pointing out the more glaring misapplications of burden and also, what is considered the ideal procedure, taking into account both the factors of accuracy and practicability.

The Per M. Board Feet of Material Plan.

This plan of burden application is perhaps the least effective of all the plans commonly used. From a past operating period it is determined that the total burden or overhead of the plant is equivalent to, say a flat rate of \$64 per 1,000 ft of the material used. On the surface this may appear to be a fairly equitable basis for applying burden but the plan is very misleading and it actually invites disaster whenever used. Applying this principle to two widely different classes of work, viz., “Moulding” and “Casework,” will illustrate its hazards, thus:

Example “A.”

1,000 lin ft Moulding.

Material—400 board ft.....	\$60.00
Labor—18 hours.....	12.60
Burden—400 ft BM @ \$64.....	25.60
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Total Cost.....	\$98.20

Example “B.”

1 Kitchen Cabinet.

Material—150 board ft.....	\$22.50
Labor—42 hours.....	29.40
Burden—150 ft BM @ \$64.....	9.60
<hr/>	
Total Cost.....	\$61.50

It is apparent from the foregoing illustration that applying burden on a basis of the board feet of material involved, is a ridiculous procedure, even though the plan were further refined so as to produce different rates for the different types of work. The quantity of material required for a job bears only the slightest relation to the burden factor; hence, this plan must be discarded.

The Percentage of Labor Plan.

Under this plan the burden is provided for, by adding a fixed percentage, say 145 per cent, of the direct labor cost. It is based on the theory that burden or overhead increases in direct proportion to the cost of the labor required to produce any given article. Undoubtedly burden consumption does depend, within certain limits, on labor expended but not on the value of the labor expended.

This plan is preferable to a considerable extent to the "Per M of Material" plan, but it is not conducive to fair or much less accurate results. Its fallacies are best demonstrated in this fashion:

Two sawyers are engaged in cutting up Plain Red Oak for finish. Brown, a very efficient sawyer receives a wage of 70c per hour, while the other man, Smith, is less expert and is paid but 60c per hour. The cost calculation for both men, considering a work period of eight direct hours, would be:

Example "C" (Brown).

Labor, 8 hours @ 70c.....	\$ 5.60
Burden, 145 per cent.	8.12
	<hr/>
Total cost	\$13.72

Example "D" (Smith).

Labor, 8 hours @ 60c.....	\$ 4.80
Burden, 145 per cent.....	6.96
	<hr/>
Total cost	\$11.76

Whether or not Brown's cut resulted in a greater net footage than Smith's, it is evident that the burden charged against Brown is excessive or otherwise that charged against Smith is too low. Both men work continuously for eight hours and in each case the actual burden consumption should be identical or at least substantially so. The heavy factors of burden, floor space, heat, light, water, etc., are the same for each operative and while Brown may have consumed a trifle more of power and oil and perhaps the wear and tear on his saw was just a little greater, these differences would be hardly perceptible and under no circumstances would equal 17 per cent more than Smith's burden.

Then consider also the case of two benchmen, Jones and Young. Jones, who is a skilled artisan performing such work as carving out stair rail crooks, assembling radius stringers, etc., is paid 80c per hour. Young is an apprentice who nails up cap trim, common porch posts, etc. His rate is 50c per hour. Figuring their respective costs for a period of eight direct hours would show results as follows:

Example "E" (Jones).

Labor, 8 hours @ 80c.....	\$ 6.40
Burden, 145 per cent	9.28
	<hr/>
Total cost	\$15.68

Example "F" (Young).

Labor, 8 hours @ 50c.....	\$4.00
Burden, 145 per cent	5.80
<hr/>	
Total cost	\$9.80

Here again is another pronounced miscarriage of the theory of the "Percentage of Labor" plan. The difference in applied burden is most astounding. It fact it would appear on the surface that efficiency tends to high overhead, whereas actually the reverse is true.

The Per Man-Hour Plan.

This plan of burden application provides that a flat rate per hour, say 97c, is added to the direct labor cost per hour. Applying the man-hour burden rate to the time of a high-priced and low-priced man for a period of eight direct hours produces the following results:

Example "G"

Labor, 8 hours @ 80c.....	\$ 6.40
Burden, 8 hours @ 97c.....	7.76
<hr/>	
Total cost	\$14.16

Example "H"

Labor, 8 hours @ 50c.....	\$ 4.00
Burden, 8 hours @ 97c.....	7.76
<hr/>	
Total cost	\$11.76

It will be observed that the "Man-Hour" plan of burden application, which involves charging for the use of the factory's equipment and its maintenance, on a basis of the time during which these facilities were in use, is basically sound. It precludes the possibility—as in the "Per M of Material" plan of placing an exorbitant burden against those types of work of which the bulk of final cost is material, or an inadequate burden charge on those classes of product that consist largely of labor. Neither will this method—as does the "Percentage of Labor" plan—saddle on the high-priced efficient workmen an excessive amount of burden and permit less skillful workmen and novices to absorb only a small burden when by reason of the additional supervision that they require and the spoilages that they are responsible for (which offset the small saving in the supplies factor of burden), they, by every law of logic and expediency, should absorb the same factory burden rate as the efficient workmen.

Refinements.

The foregoing discussions do not contemplate any refinement of the several plans mentioned, but in justice to these methods it must be stated that they are sometimes developed to a higher plane. For instance, the burden rates used in the examples consider only one rate for the entire product. Quite

frequently a line of demarcation is drawn between the burden as applied to lumber, machine labor and bench labor and for the disposition or sale of the product. These refinements tend to create a somewhat better balanced procedure, but they will not dispose of the irregularities already pointed out.

The M. C. I. B. Plan.

This plan will be recognized as embracing the merits of all the previous methods without, however, maintaining their discrepancies.

Every mill operator engages to a certain extent in what may be termed a jobbing business, that is, he sells some commodities that for one reason or another are not produced in his own plant, viz., glass, stock doors and sash, roofing, sash cord, pulleys, weights, screen wire and frequently all veneered doors except perhaps those that cannot be obtained from other sources within a reasonable time. Hence it is absolutely necessary to provide a burden rate for disposing of items of this nature and with this end in view the M. C. I. B. plan makes a clear distinction between the actual manufacturing and the disposing or selling units. In other words, the **Factory Cost** or the cost of all items in their manufactured state, is determined first and the charge for warehousing, packing, delivery, selling and administrative expenses is then added as a percentage burden of the **Factory Cost**, the addition of the two costs producing **Total Cost**.

The M. C. I. B. plan takes cognizance, also, of the fact that lumber before entry to the factory proper is subject to burdens that bear no relation—from a cost aspect—to the operation of the factory itself, for which reason lumber yard and kiln costs are diffused only over the material handled through these units.

Those expenses relating solely to factory production are segregated as to machine and bench operatives, so that the direct machine and bench men may be burdened at a rate reflecting their respective proportion of the factory burden.

A distinction between machine burden and bench burden is clearly necessary when it is borne in mind that the machine men consume a much heavier portion of investment in the form of the machine equipment itself, repairs, power and supplies, than do the benchmen. Both classes, of course, are subject to one broad general burden for floor space, heat, light, supervision, etc., and this element is distributed equally to each class of workmen.

Summarizing the Unit Burdens as they exist in the M. C. I. B. plan, there are then five basic rates, to-wit:

1. Lumber—Yardage and Handling Burden, which is expressed as a flat rate per 1,000 gross board feet.
2. Lumber—Kiln Burden, which is expressed as a flat rate per 1,000 gross board feet.
3. Machine Burden, which is expressed as a flat rate per man-hour.
4. Bench Burden, which is expressed as a flat rate per man-hour.
5. Commercial Burden, which is expressed as a percentage of the **Factory or Manufactured Cost**.

Burden Compilation.

Without any attempt at technical elaboration, this subject may be briefly depicted by means of the following "Statement of Cost." These figures are taken from an actual cost audit and have been revised only so far as to eliminate odd numbers, thus making the process of burden compilation readily discernible. Each of the burden units, that is items 5, 6, 7, 8 and 9, includes its proper share of interest on investment for land, buildings, equipment and average stock; taxes on the same items; depreciation on buildings and equipment and insurance on buildings, equipment and average stock, and of course also the supplies, repair and labor expenses peculiar to each unit.

Cost Statement—12 Months.

Direct Material

1. Lumber (1,000,000 board ft) ..	\$ 50,000.00
2. Glass, Veneers, Screen Wire, Pulleys, Weights, Cord, Stock Millwork, etc.....	14,000.00

Direct Labor

3. Machine Labor (26,000 hours)	18,000.00
4. Bench Labor (40,000 hours) ..	26,000.00

Direct Cost.....	<u>\$108,000.00</u>
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Yard and Factory Burden

5. Yard Expense (1,000,000 bd ft)	\$ 6,000.00	
6. Kiln Expense (500,000 bd ft) .	4,000.00	
7. Machine Expense (26,000 hours)	13,000.00	
8. Bench Expense (40,000 hours)	12,000.00	\$35,000.00
Factory Cost.....		<u>\$143,000.00</u>

Commercial Burden

9. Warehouse, Delivery, Selling and Administrative Expense..	\$ 28,600.00
Total Cost.....	<u>\$171,600.00</u>

The respective burden rates would be calculated in this fashion:

Lumber—Yardage and Handling Burden

Item No. 5, Yard Expense \$6,000 divided by 1,000,000 board ft handled equals \$6 per M. B. M. burden rate.

Lumber—Kiln Burden

Item No. 6, Kiln Expense \$4,000 divided by 500,000 board ft dried, equals \$8 per M. B. M. burden rate. This rate is in addition to the \$6 per M. B. M. rate for Yardage and Handling.

Machine Burden

Item No. 7, Machine Expense \$13,000 divided by 26,000 hours, equals 50c per hour burden rate.

Bench Burden

Item No. 8, Bench Expense \$12,000 divided by 40,000 hours, equals 30c per hour burden rate.

Commercial Burden

Item No. 9, Commercial Expense \$28,600 divided by Factory Cost \$143,000 equals 20 per cent burden rate.

Application of the M. C. I. B. Burdens.

Under the M. C. I. B. cost plan the burden application to a cost record of six yellow pine stair newels, using the foregoing rates, would be:

Example "I."

Material

Delivered Purchase Price 1" B&B Yel.Pine.\$90.00
Yardage and Handling Burden..... 6.00

70 Board ft BM (including waste)..@.....\$96.00 \$ 6.72

Machine

Labor (3 hours).....\$ 2.00
Burden (3 hours).....@ \$.50 1.50 3.50

Bench

Labor (28 hours)..... 20.10
Burden (28 hours).....@ \$.30 8.40 28.50

Factory Cost..... \$38.72

Commercial Burden 20 per cent..... 7.74

Total Cost..... \$46.46

. If the item in question involved the sale of a veneered door purchased from another plant or perhaps some such commodity as a light of art glass—the assumption being, of course, that neither of these articles would be produced in the plant under consideration—then the cost calculation would confine itself simply to taking the delivered purchase price and adding thereto commercial burden, viz.:

Delivered Purchase Price.....\$30.00
Commercial Burden 20 per cent..... 6.00

Total Cost.....\$36.00

There are those who argue that a commercial burden is unnecessary and that by reason of its being applied as a percentage of the factory cost it produces results not in keeping with the burden actually expended through the commercial expense units. However, actual analyses of the operations of more than 150 concerns where the M. C. I. B. Standard Cost Finding System has been put into operation reveal the fact that the traffic in commodities not produced in the mills of those companies, aggregates quite a healthy figure and

therefore there remains no alternative but to set up a commercial burden. Moreover the percentage plan for commercial burden is not contrary to the burden that actually occurs for this portion of a mill enterprise. A mahogany job should be burdened with a greater amount of expense than the same job in yellow pine, for the reason that the use of mahogany requires additional expenditures for insurance and the taxes, the interest on borrowed money would be proportionately higher, and the amount of interest for vested capital would increase also. There are a number of other items coming under the head of commercial expense, such as bad accounts, errors not chargeable to the factory, executive salaries, and so on, which likewise would increase in proportion to the material value.

It must be remembered, of course, that a certain mean average cannot be dispensed with under any system of cost accounting and while this condition cannot be entirely eliminated it can be minimized and will be, through the employment of the M. C. I. B. plan. A recalculation of the earlier examples presented herein will furnish conclusive proof of the superiority of this method; and regardless of whether or not a mill operator engages the staff of the Millwork Cost Information Bureau for devising his cost system, he should nevertheless accept its burden plan as reflective of the best that is obtainable.

If your present burden procedure is along the lines of either the first, second or third plans, you had best revise to the M. C. I. B. method. The others are too unsound, ineffective and perilous to be tolerated in an industry that, aside from its cost problem, involves probably an over-abundance of still other difficulties.

